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EXCAVATOR HITCH

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(56) Prior Art Documents
AU 34999/89 E02F
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(57) It is desirable to provide a hitch for an excavator, backhoe or similar piece of equipment which enables relatively simple and quick replacement of a tool, bucket or the like.

It is also desirable to provide a quick release hitch for an excavator or similar implement which does not require relatively expensive and complicated hydraulic controls.

It is also desirable to provide a quick release hitch for an excavator which is of sturdy yet simple construction and which securely locks a tool or other implement to the arm of an excavator.

It is also desirable to provide a quick release hitch which is simple to manufacture, is economical and is easy to use.

CLAIM

1. A hitch for an arm of an excavator, backhoe or the like, comprising a pair of laterally spaced walls defining a chamber, a first portion of both of the walls being shaped to releasably engage a first pin of an implement, a second portion of the walls being shaped to have a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first position to a second position in which the wedge means is engageable with the second implement pin to retain the second implement pin within the slot.

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8. A hitch for an arm of an excavator, backhoe or the like comprising a pair of laterally spaced upper walls each having at least two pin holes for attaching to the arm, a pair of laterally spaced lower walls defining a chamber, a front end of both the lower walls shaped to releasably engage a pin on an implement, a lower edge of both lower walls adjacent a rear end thereof having a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first, position to a second, position in which the wedge means is engageable with the second implement pin within the slot.

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Complete Specification for the invention entitled: EXCAVATOR HITCH

The following statement is a full description of this invention, including the best method of performing it known to me:-

This invention relates to an excavator hitch and relates particularly to a manually operated hitch providing quick and simple means for attaching a bucket or other piece of equipment to an excavator machine.

A conventional hydraulically operated excavator or backhoe has an articulated arm to which is releasably attached the appropriate tool to be used. This might comprise a bucket, a blade, a pick or any other type of tool which can be manipulated by the excavator arm.

Generally, at the end of the excavator arm there is provided a pair of links which are movable hydraulically, and the bucket or other tool is connected to the arm and to one end of the links whereby the tool can be pivoted relative to the arm by the tipping links.

Generally, a hitch is provided between the end of the articulated arm and the tipping links and the tool. Such a hitch may be provided with more than one pair of pin holes to allow for a variety of different types of tools to be attached thereto and given the appropriate movement required by the tipper links.

It is common practice for tools to be attached to the hitch, or directly to the arms, by pins which pass through pin holes in the respective parts, the pins being secured by circlips, locking pins or other securing arrangements. With this arrangement, in order to change a tool, or a hitch, it has been necessary to remove the locking pins, remove the hitch pins and then replace the tool. This can be a relatively time consuming operation, and it is a frustrating operation when a tool needs to be changed on a regular basis, such as excavating a trench or a hole which requires alternate use of a pick and a bucket.

It has been proposed to provide quick release hitches to enable the excavator arm to be quickly attached to a tool. However, in one proposal, a separate hydraulic line is required to operate a hydraulic cylinder built into the hitch, and this is relatively difficult and expensive to install on existing excavator equipment.

It is desirable to provide a hitch for an excavator, backhoe or similar piece of equipment which enables relatively simple and quick replacement of a tool, bucket or the like.

It is also desirable to provide a quick release hitch for an excavator or similar

implement which does not require relatively expensive and complicated hydraulic controls.

It is also desirable to provide a quick release hitch for an excavator which is of sturdy yet simple construction and which securely locks a tool or other implement to the arm of an excavator.

It is also desirable to provide a quick release hitch which is simple to manufacture, is economical and is easy to use.

According to one aspect of the invention there is provided a hitch for an arm of an excavator, backhoe or the like, comprising a pair of laterally spaced walls defining a chamber, a first portion of both of the walls being shaped to releasably engage a first pin of an implement, a second portion of the walls being shaped to have a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first position to a second position in which the wedge means is engageable with the second implement pin to retain the second implement pin within the slot.

According to another aspect of the invention there is provided a hitch for an arm of an excavator, backhoe or the like comprising a pair of laterally spaced upper walls each having at least two pin holes for attaching to the arm, a pair of laterally spaced lower walls defining a chamber, a front end of both the lower walls shaped to releasably engage a pin on an implement, a lower edge of both lower walls adjacent a rear end thereof having a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first, position to a second, position in which the wedge means is engageable with the second implement pin within the slot.

In one particular form of the invention the wedge means comprises a single plate portion which, in the second position of the wedge means, engages the second implement pin whereby the second implement pin is wedged against an edge of the slot.

In another particular form of the invention the wedge means comprises a V-shaped wedge defined by a first plate portion and a second plate portion extending at an angle to the first plate portion, the second implement pin being engaged within the V-shaped wedge when the wedge means is in the second engaged position.

Preferably, the wedge means is movable along guideways provided along each side of the chamber. A nut is fixed to the first plate portion and a bolt extends from one end of the chamber to engage with the nut, rotation of the bolt causing movement of the plate portions along the guideway between the first and second positions.

With this arrangement, the plate portions are movable using simple tools such as a spanner, socket or the like. The quick release hitch of the invention, therefore, does not require complicated or expensive hydraulics or other means and yet enables a quick attachment of the hitch to an implement such as a bucket or the like.

In order that the invention is more readily understood one embodiment thereof will now be described with reference to the accompanying drawings wherein:

Figure 1 is a sectional, side elevational view of a hitch in accordance with the invention, and

Figure 2 is a view taken along the lines 2-2 of Figure 1, but omitting the implement pin.

Referring to the drawings, the hitch 12 comprises a pair of laterally spaced upper walls 14 interconnected by a central plate 16. The upper walls 14 are each provided with three holes 17, which are generally reinforced on the outer side, to receive pins 18 for attaching the hitch to the arm of an excavator, backhoe or like machine.

The hitch 12 further includes two laterally spaced lower walls 19 extending downwardly from the central plate 16. A rear wall 21 extends between the rear edges of the lower walls 19 while the front edges 22 of the lower walls 19 are each formed with a recess 23 to receive a first implement pin (not shown) by which the hitch is attached to an implement such as a bucket or the like. A curved, reinforcing plate 24 interconnects the edges of the recesses 23.

The lower edges 26 of the lower walls 19 are provided adjacent the rear wall 21 with upwardly extending slots 27 adapted to receive a second implement pin 28.

The lower walls 19 each have an internal, opposed guide rail 29 extending forwardly from the rear wall 21.

A quick release, pin lock 31 is located within the chamber defined by the

lower walls 19 and the rear wall 21. The pin lock 31 has a first plate section 32 secured to upwardly and outwardly extending guide engaging legs 33; the guide legs defining with the first plate portion 32 recesses 34 which engage over the guide rails 29.

A second plate section 36 extends downwardly and rearwardly from the front edge of the first plate section 32 to define an angle therebetween of approximately 30°. It will be appreciated, however, that this angle may be anything from about 15° through to 60° or more, depending on the construction of the pin lock structure.

A nut 37 is fixed on the upper surface of the first plate section 32 adjacent the front edge thereof and a bolt 38 passes through the rear wall 21 and engages with the nut 37. The bolt 38 is provided with fixed washers 39 so that rotation of the bolt causes movement of the pin lock 31 along the guide rails 29.

In use, the bolt 38 is rotated to move the pin lock 31 to a disengaged, forward position. If desired, a stop may be provided on the end of the bolt 38 to prevent undesired, full disengagement of the nut 37 from the bolt 38. Such a stop may be removable to enable removal of the pin lock 31 from the hitch 12.

With the pin lock 31 in the forward position, the recesses 23 may be engaged with a first implement pin (not shown) and the hitch then rotated about the axis of such first pin until the second implement pin 28 engages in the slots 27. In this position, the bolt 38 is rotated to draw the pin lock 31 rearwardly until the second implement pin 28 is wedged in the angle between the first and second plate sections 32 and 36, as shown in Figure 1. In this position, the hitch is secured to the implement which may then be used for its desired purpose.

To release the implement, the bolt 38 is rotated in the opposite direction to move the pin lock 31 forwardly thus releasing the second implement pin 28.

It will be understood that the hitch of the present invention is extremely simple in construction, is robust so as to withstand the rigours of mechanical excavator equipment usage, and is simple to use to quickly attach and disengage from an implement.

Many modifications may be made in the design and/or construction of a quick release hitch in accordance with the invention. For example, the pin lock 31 may incorporate a lower plate only to wedge beneath the second implement pin 28 and to

wedge that pin against the upper edges of the slots 27. In this arrangement, the first plate section 32 is either omitted or is disposed in the chamber such as not to be contacted by the second implement pin 28 in the engaged position.

Many other modifications may be made within the scope of the invention and all such modifications shall be deemed to be within the ambit of the above description. Such modifications may be to increase the strength of the excavator hitch such as making the pin lock 31 out of a single piece of steel. In this way the first and second plate sections 32 and 36 are integral and able to be shaped to increase the strength of the second plate section 36. Also the guide engaging legs 33 and the first plate portion would be integral. To facilitate machining the guide engaging legs 33 could be connected, thereby metal would extend from one guide engaging leg to the other and thereby around the path of the bolt 38. The guide rails 29 may also be strengthened by extending further down along the lower walls 19. To accommodate this extension, the pin lock 31 would need to be narrower. Other modifications are also within the scope of the disclosure such as adding extra safety features such as a safety backup stop screw to stop the pin lock 31 if bolt 38 breaks and a safety pin which would extend through the ears on the bucket or the like to be attached to the hitch and through the hitch. This safety pin would operate separately to the pin lock mechanism.

The claims defining the invention are as follows:

1. A hitch for an arm of an excavator, backhoe or the like, comprising a pair of laterally spaced walls defining a chamber, a first portion of both of the walls being shaped to releasably engage a first pin of an implement, a second portion of the walls being shaped to have a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first position to a second position in which the wedge means is engageable with the second implement pin to retain the second implement pin within the slot.

2. A hitch according to claim 1, wherein the first portion is located at a front end of both the lower walls and the second portion is located at a lower edge of both lower walls adjacent a rear end thereof.

3. A hitch according to claim 1 or claim 2, wherein the wedge means is movable along guide ways provided along each side of the chamber.

4. A hitch according to any one of the preceding claims, wherein the wedge means comprises a single plate portion which, in the second position of the wedge means, engages the second implement pin whereby the second implement pin is wedged against an edge of the slot.

5. A hitch according to any one of claims 1 to 3, wherein the wedge means comprises a V-shaped wedge defined by a first plate portion and a second plate portion extending at an angle to the first plate portion, the second implement pin being engaged within the V-shaped wedge when the wedge means is in the second position.

6. A hitch according to claim 5, wherein the angle between the first plate and the second plate is between about 15° and 60°.

7. A hitch according to any preceding claim wherein the bolt means comprises a nut secured on the wedge means and a bolt extending from one end of the chamber to engage with the nut, rotation of the bolt causing movement of the wedge means between the first and second positions.

8. A hitch for an arm of an excavator, backhoe or the like comprising a pair of laterally spaced upper walls each having at least two pin holes for attaching to the arm, a pair of laterally spaced lower walls defining a chamber, a front end of both

the lower walls shaped to releasably engage a pin on an implement, a lower edge of both lower walls adjacent a rear end thereof having a slot to receive a laterally extending second implement pin, wedge means in the chamber, and bolt means engaged with the wedge means to move the wedge means from a first, position to a second, position in which the wedge means is engageable with the second implement pin within the slot.

9. A hitch according to claim 8 wherein the wedge means comprises a first plate portion and a second plate portion extending at an angle to the first plate portion to define a V-shaped recess therebetween, guide ways provided along each side of the chamber, the plate means being movable along the guide ways between the first and second positions, whereby the second implement pin is engaged within the V-shaped recess when the wedge means is in the second engaged position.

10. A hitch according to claim 8 wherein the wedge means comprises a single plate portion which, in the second engaged position of the wedge means, engages the second implement pin whereby the second implement pin is wedged against an edge of the slot.

11. A hitch according to any one of claims 8 to 10 wherein the bolt means comprises a nut secured on the wedge means and a bolt extending from one end of the chamber to engage with the nut, rotation of the bolt causing movement of the wedge means between the first and second positions.

12. A hitch, for an arm of an excavator, backhoe or the like, substantially as hereinbefore described with reference to the drawings or having any of the features herein disclosed.

13. An excavator, backhoe or other like apparatus, including an arm carrying a hitch in accordance with any one of the preceding claims..

DATED this 28rd day of August, 1991

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ABSTRACT

A hitch (12) for quick and easy connection and disconnection of excavating equipment to an arm of an excavator or the like, the hitch (12) being integral with arm or connected to pins through pinholes (17), the implement having two integral pins (28) the first being positioned in slot (23) the second being held in slot (27) by wedge means (36) movable between engaged and disengaged positions by means of rotation of single bolt means (38).

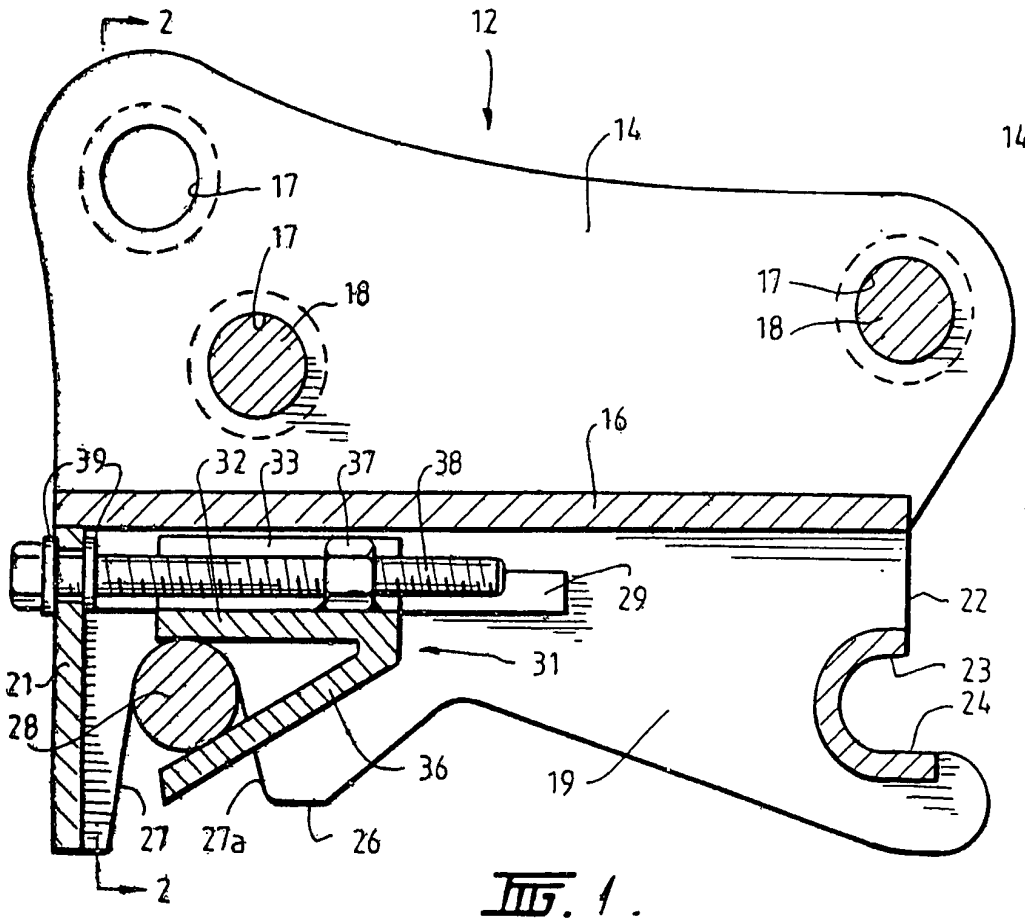

FIG. 1.

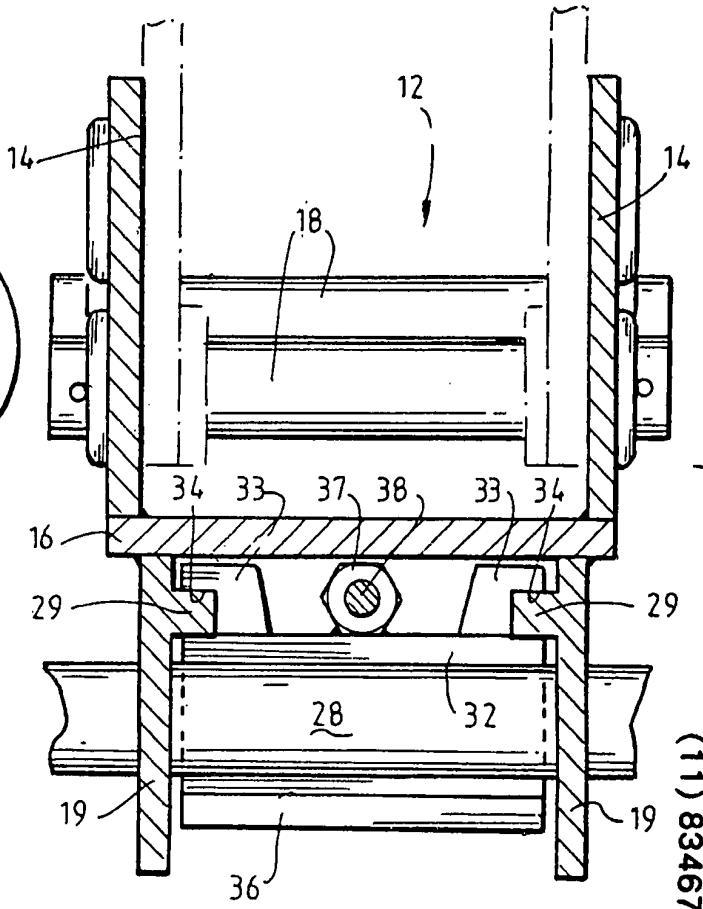

FIG. 2.

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